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12 Challenge Statements on Maritime Decarbonisation, Port Productivity and Cyber Resilience Identified for Smart Port Challenge 2023

The Maritime and Port Authority of Singapore (MPA) and NUS Enterprise, the entrepreneurial arm of the National University of Singapore (NUS), launched PIER71™'s[1] Smart Port Challenge (SPC) 2023 today at InnovFest x Elevating Founders 2023, the official start-up event of Asia Tech x Singapore.

2. SPC 2023 was officially launched by Mr Niam Chiang Meng, MPA Chairman at the event comprising international start-ups, venture capitalists, and other corporate participants. The opening ceremony also featured a panel discussion on "Achieving Energy Transition in the Maritime Industry" with speakers from Kuok Maritime, SeaTech Solutions International, Sinoda Shipping Agency and SPC 2022 Special Mention winner SunGreenH2.

Challenge Statements for SPC 2023

3. SPC is an annual innovation competition to find the best ideas and solutions from technology start-ups to address challenges and innovation opportunities, put forth by the maritime industry. SPC 2023 has 12 challenge statements[2] spanning key areas such as maritime decarbonisation, smart port operations, and supply chain resilience.

4. Technology start-ups based in Singapore as well as those based overseas are invited to submit their proposals by **31 July 2023**.

5. Shortlisted start-ups will be mentored by 21 maritime companies under the PIER71™ Accelerate programme and may be eligible for a MPA MINT-STARTUP grant of up to S$100,000. They will also receive support through PIER71™'s global network of partners. The top three winners for SPC 2023 will be awarded with cash prizes at the grand finals in November 2023. The PIER71™ programme has supported over 100 start-ups, and these start-ups have raised over S$50million in venture capital and MPA grant funding since the programme's inception.

6. In his video address, Mr Chee Hong Tat, Senior Minister of State for Finance and Transport highlighted that PIER71™ alumni had made their mark globally, adding that he was

[1] Port Innovation Ecosystem Reimagined @ BLOCK71 (PIER71™) was jointly established in 2018 by MPA and NUS Enterprise.
[2] Annex A: SPC 2023 Challenge Statements

encouraged to see their growth and success as they expanded operations and scaled up their product offerings. He also called for aspiring entrepreneurs and technology start-ups in Singapore to join SPC 2023, to solve the most pressing challenges facing the maritime industry and to shape the future of Maritime Singapore.

7. Mr Kenneth Lim, MPA's Assistant Chief Executive (Industry & Transformation) said, "Going into its seventh year, the Smart Port Challenge continues to break down obstacles for innovations to be adapted and adopted in Maritime Singapore. Strong collaboration plays a vital role in supporting the transformation of the maritime industry, and we hope the gathering of PIER71™ alumni, our corporate partners, and VCs will continue to fuel the growth of the new Marinetech start-ups coming into PIER71™ this year".

8. Professor Chen Tsuhan, NUS Deputy President (Innovation and Enterprise), said, "We look forward to onboarding a new cohort of start-ups into the Smart Port Challenge PIER71™ Accelerate programme with the anticipation that they will bring forth exciting technologies and innovative solutions to address the maritime industry's challenges. With support from the wider maritime ecosystem to nurture and promote their growth, we are certain that these start-ups and the wider PIER71™ alumni will unlock new possibilities in efficiency, safety and environmental sustainability that will make an impactful contribution to the maritime industry."

Maritime Innovation and Technology (MINT)-STARTUP grant

9. Five start-ups from SPC 2022 and SPC 2021 were also awarded the MINT-STARTUP grant[3] at the event. The grant will support prototype development and test-bedding of solutions to facilitate commercialisation. This brings the total number of grant recipients to 55. These five start-ups are collaborating with maritime corporate partners from PIER71™ on pilot projects that leverage data analytics, artificial intelligence, and upcycling of waste to produce high-value products, amongst others.

PIER71™ expands its Venture Capitalist Network

10. To further enhance the maritime ecosystem, PIER71™ Venture Capitalist Network will be expanded to include four new venture capitalists[4] with S$6 million in funds to support promising maritime start-ups. The four venture capitalists are Narwhale Ventures, Tradeworks.vc, Kibo Invest, and Paragon Ventures. This brings the total number of venture capitalists under the PIER71™ Venture Capitalist Network to 12.

11. A recording of the SPC 2023 launch event will be available on https://pier71.sg.

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About PIER71™

Founded by the Maritime and Port Authority of Singapore (MPA) and the National University of Singapore (NUS), through its entrepreneurial arm NUS Enterprise, PIER71™ (Port Innovation Ecosystem Reimagined at BLOCK71) aims to grow Singapore's maritime

[3] Annex B: Recipients of MINT-STARTUP grant
[4] Annex C: New venture capital partners

innovation ecosystem. PIER71™ boosts innovation in the maritime and maritime-related industries by attracting talents, creating opportunities for the exchange of knowledge and ideas, attracting investments into start-ups and accelerating ventures.

PIER71™ designs and delivers programmes to uncover opportunities within the industry and supports entrepreneurs from ideation to acceleration of their ventures. PIER71™ provides access to various markets, demand drivers, technology solution providers, investors and more. PIER71™ also represents a budding and increasingly vibrant ecosystem of stakeholders who are keen to digitalise and create the next wave of maritime innovation.

For more information, please visit https://pier71.sg

About the Maritime and Port Authority of Singapore (MPA)
MPA was established on 2 February 1996 with the mission to develop Singapore as a premier global hub port and international maritime centre, and to advance and safeguard Singapore's strategic maritime interests. MPA is the driving force behind Singapore's port and maritime development, taking on the roles of port authority, maritime and port regulator and planner, international maritime centre champion, national maritime representative and a champion of digitalisation and decarbonisation efforts at regional and international fora such as at the International Maritime Organization. MPA partners industry, research community and other agencies to enhance safety, security, and environmental protection in our waters, facilitate maritime and port operations and growth, expand the cluster of maritime ancillary services, and develops maritime digitalisation and decarbonisation policies and plans, R&D, and manpower development. MPA is responsible for the overall development and growth of the maritime domain and Port of Singapore. In 2022, Singapore remained one of the world's busiest transshipment hubs with a container throughput of 37.3 million 20-foot equivalent units (TEUs).

For more information, please visit www.mpa.gov.sg/

About National University of Singapore (NUS)
The National University of Singapore (NUS) is Singapore's flagship university, which offers a global approach to education, research and entrepreneurship, with a focus on Asian perspectives and expertise. We have 16 colleges, faculties and schools across three campuses in Singapore, with more than 40,000 students from 100 countries enriching our vibrant and diverse campus community. We have also established our NUS Overseas Colleges programme in more than 15 cities around the world.

Our multidisciplinary and real-world approach to education, research and entrepreneurship enables us to work closely with industry, governments and academia to address crucial and complex issues relevant to Asia and the world. Researchers in our faculties, research centres of excellence, corporate labs and more than 30 university-level research institutes focus on themes that include energy; environmental and urban sustainability; treatment and prevention of diseases; active ageing; advanced materials; risk management and resilience of financial systems; Asian studies; and Smart Nation capabilities such as artificial intelligence, data science, operations research and cybersecurity.

For more information on NUS, please visit www.nus.edu.sg.

About NUS Enterprise

NUS Enterprise, the entrepreneurial arm of the National University of Singapore (NUS), plays a pivotal role in advancing innovation and entrepreneurship at NUS and beyond. It actively promotes entrepreneurship and cultivates global mind-sets and talents through the synergies of experiential entrepreneurial education, active industry partnerships, holistic entrepreneurship support and catalytic entrepreneurship outreach. Its initiatives and global connections support a range of entrepreneurial journeys and foster ecosystem building in new markets. These initiatives augment and complement the University's academic programmes and act as a unique bridge to industry well beyond Singapore's shores.

For more information, please visit https://enterprise.nus.edu.sg.

For media enquiries, please contact:

Gerald Kheng
MPA Corporate Communications
Email: gerald_kheng@mpa.gov.sg

Marianne Choo
PIER71™ Marketing & Digital Communications
Email: m.choo@nus.edu.sg

Annex A: SPC 2023 Challenge Statements

Sustainability: Green Technologies & Decarbonisation	
1.	Accelerating Biofuel Adoption: How Can We Increase the Adoption of Biofuels Through Assurance of their Quality and Traceability?
2.	Building Confidence in Ammonia: How Can We Build Confidence in Ammonia as a Maritime Fuel?
3.	Preparing for Electrification: How Can Electrification Technology and Infrastructure meet the Efficiency and Cost Requirements of the Maritime Sector?
4.	Transforming Carbon: How Can We Best Utilise Carbon as a High-Value Waste Stream?
Smart Port Operations	
1.	Improving Real-time Port Productivity: How Can We Streamline Communication and Have Real-Time Operational Overview of Vessel Activities in the Port?
2.	Improving Cement Removal Process: How Can We Remove Cement Residue in an Automated, Effective, and Efficient Manner?
3.	Improving Real-time Port Productivity: How Can We Gain Full Visibility of Warehouse Hub Operations, Facilities and Assets Utilization?
4.	Wireless Connectivity in Port Waters: How Can We enable electronic transactions and data-intensive applications in port waters?
5.	Black Smoke Emission: How Can We Capture Dark Smoke Emission?
Supply Chain Resilience	
1.	Greening the Supply chain: How Can We Enhance Transparency, Traceability, Regulatory Compliance, and Accountability at a Sector-Wide Level to Enable a Green Maritime Supply Chain?
2.	Driving Cyber Readiness: How Can We Improve the Maritime Sector's Cyber Readiness?
3.	How Can We Make Marine Insurance More Efficient for the Customer and Insurer – Through Risk Prevention or Mitigation? How Should Insurance Respond to Emerging Marine Trends?

Annex B: Recipients of the MINT-STARTUP Grant

#	Start-up	Project Title	Project Description	Industry Partner(s)
1	Greywing Pte Ltd	Automate Crew Planning Process to Improve Efficiency for Crewing Managers	To develop a crew planning AI engine that will help operational optimization by aggregating data from various sources, reducing manual tasks, and optimizing delivery for the shore-based crew management teams. The user interface will make it easier for the crewing team to interact with the software. Management reporting tools will provide visibility at both fleet and seafarer levels.	BW Maritime Pte Ltd, Hafnia Pte Ltd, and OMC Shipping Pte Ltd
2	Nanomatics Pte Ltd	Development and deployment of plastic waste upcycling system for generation of oil and hydrogen on board of vessels	The project is to develop and test-bed a plastic waste upcycling demo prototype in maritime operational environment. Showcase the potential value of upcycling up to 1-ton of marine plastics waste by using Nanomatics's technology to output high value industry products such as oil, hydrogen, and carbon nanotubes.	Victory Pte Ltd
3	Green COP Pte Ltd	Trialling of Butanol-based Biofuels for Harbour Crafts	The project proposes to create a circular economy solution to produce biofuels which can be used as an interim or transitional fuels by recycling the agricultural waste. The company has an innovative pre-treatment and fermentation technology to produce biofuels (Butanol) by upcycling biowaste.	PaxOcean Engineering Pte Ltd

#	Start-up	Project Title	Project Description	Industry Partner(s)
4	Brains Behind Consulting Pte Ltd.	Converting Ocean Carbon to Bio-Oil	The proposed project by Brains Behind Consulting is to develop a prototype that includes a bio fouling recovery unit which will collect the bio fouling from ships and underwater structures through the Roverclean, which is an existing product. The recovery unit is also provided with a Pyrolysis reactor (micro refinery), which collects the waste generated from ports, ships and process them to produce bio-oil and carbon black. The uniqueness of the innovation is to convert bio fouling and waste to bio-oil and in return avail carbon credits and help to reduce the energy consumption of ports.	Synergy Marine Group
5	IOTEE Pte Ltd	Improve Operational Efficiency at Lighter Terminals Through better visibility of lighter boats' location	The proposed project will leverage IOTEE's Solar Powered GNSS Tracker, that support both GPS and BeiDou communication protocol, to provide accurate location tracking for the lighters. It also supports Over-The-Air (OTA) technology for easy firmware updates, change of configuration without distracting the lighters' Operations. The accuracy of solar powered GNSS tracker would facilitate the development of an automated dockage system, reducing manpower, potential errors, and disputes at the terminal regarding dockage duration.	Jurong Port

More information is available at https://pier71.sg/smart-port-challenge-past-cohort

Annex C: New Venture Capital Partners

#	Venture Capital Partner	About
1	Kibo Invest	Kibo Invest is a Singapore-based private investment office that aims to achieve risk-adjusted returns through a selective due diligence process. The company is currently developing a strong emphasis on climate technology to contribute towards a sustainable future.
2	Narwhale Ventures	Narwhale Ventures funds pre-seed to series A blue economy start-ups based on decarbonization, digitalization, healthy consumption (plastic, water, aquatic food).
3	Paragon Ventures	Paragon Capital Management Singapore Private Limited is an independent Asset Management Company that assists Accredited Investors and High Net Worth individuals in managing their investment portfolios. We are an Exempt Financial Advisor and hold a Capital Markets Services License granted by the Monetary Authority of Singapore (MAS). With more than 60 years' combined experience in financial services, our team knows exactly what investors need and is fully committed to deliver on the company's mission: to grow assets, build unbreakable trust and provide impeccable service. Paragon Ventures I is an early-stage, sector agnostic venture capital fund. We invest in founders who are subject matter experts with deep understanding of a problem statement and can create effective solutions to solve them. We also invest in inventors and visionaries who see strong market potential for their innovative products and solutions and have spent years researching into the opportunity.
4	Tradeworks.VC	Tradeworks.VC is a pure play logistics technology venture capital firm with nine startup investments since 2021. The company invest in early stage (Angel to Series A) Digital Trade Enablers (as opposed to Disruptors), with game changing global business models that exhibit significant network effects. Leveraging their unique combination of industry and VC experience/network, Tradeworks.VC adopts a hands-on approach as an investor, actively participating in strategy, business development and fundraising. The majority of Tradeworks.VC's investors consist of experienced professionals within the logistics industry.